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JUL 16 1964

CURRENT SERIAL PERIODICALS

WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
MONTANA

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE.
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies
named above in cooperation with Federal, State, and private
organizations listed on the inside back cover of this report.

AS OF
FEB. 1, 1964

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 2807, Portland, Oregon 97208.

PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
RIVER BASINS			
WESTERN UNITED STATES			
MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS	
BASIC DATA SUMMARY			
OCTOBER 1	PORLTAND, OREGON	ALL COOPERATORS	
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

WATER SUPPLY OUTLOOK
FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS
for
MONTANA

Report Prepared
By
Phillip E. Farnes
and
Stanley E. Cook

Snow Survey and Water Supply Forecasting Section
Soil Conservation Service
Box 855
Bozeman, Montana

Issued By

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State Conservationist
Soil Conservation Service
Bozeman, Montana

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Montana Agricultural
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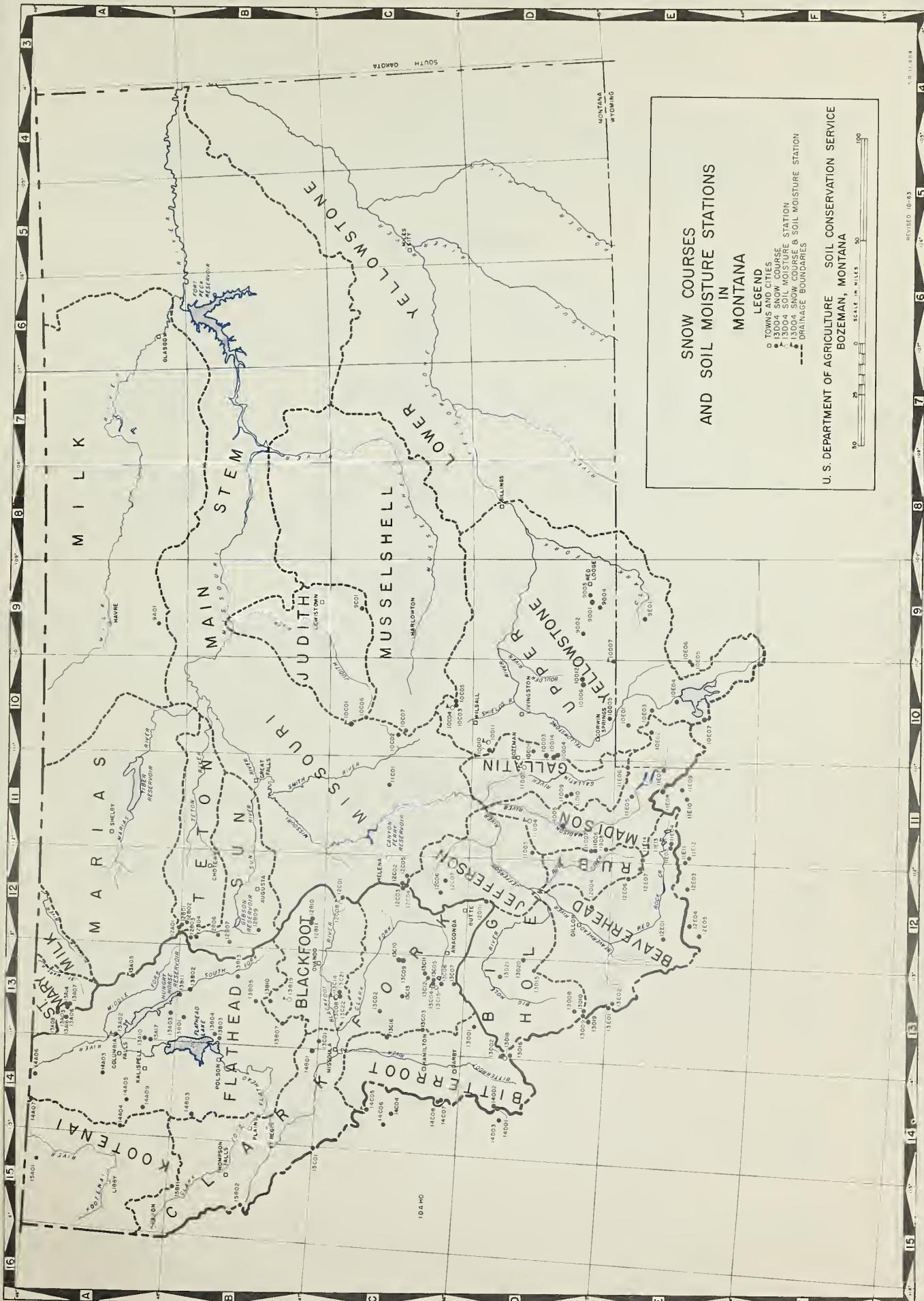
MONTANA
WATER SUPPLY OUTLOOK
as of
February 1, 1964

West of the Continental Divide, streamflow during the spring and summer months should be adequate in most drainages of the state. The present outlook for the April through September streamflow is 5 to 15 percent below average, assuming near average precipitation in the mountains during the next few months.

East of the Continental Divide, streamflow should provide an adequate irrigation water supply except in the Milk and Marias River drainages in the northern portion of the state and in the Rock Creek and Red Lodge Creek drainages near Red Lodge in the southern portion of the state. If snow accumulation is below average during the next three months, shortages of irrigation water could occur on other Missouri and Yellowstone tributaries as mountain soil moisture and reservoir storage are generally below average.

Snow surveys made near the first of February in the Kootenai River basin in British Columbia indicate the mountain snow pack is 105 percent of last year and 78 percent of the 1943-57 average.

In the Flathead River drainage the snow pack shows a good increase and is now 50 percent more than last February 1 and 84 percent average.



INDEX TO MONTANA SNOW COURSES AND SOIL MOISTURE STATIONS

SNOW COURSES

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1/ Numerals 1,2,3,4,5,5½,6 refer to January 1, February 1, March 1, .

1. Soil Conservation Service	6. National Park Service
2. U. S. Forest Service	7. Montana Experiment Station
3. U. S. Geological Survey	8. Montana State Forestry School
4. Montana Power Company	9. Dominion Water & Power Bureau

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SOIL MOISTURE DATA

AS OF FEBRUARY 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	** AVERAGE

COLUMBIA RIVER BASIN

<u>Flathead</u>								
13A02M	Desert Mountain	5600	54	8.4	1/31	5.8	7.2	7.0
13A05M	Marias Pass	5250	54	6.5	1/28	4.4	5.3	5.0
<u>Clark Fork</u>								
13C15M	Georgetown Lake	6450	48	8.3	1/27	2.4	3.2	-
13B19M	Seeley Lake	4030	48	10.6	1/31	1.6	-	-
<u>Bitterroot</u>								
13D18M	Gibbons Pass	7100	48	7.1	1/29	5.5	5.8	-
14C05M	Lolo Pass	5250	48	8.5	1/28	5.2	-	-

MISSOURI RIVER BASIN

<u>Beaverhead</u>								
11E13M	Lakeview	6700	48	15.3	1/31	8.3	5.4	-
<u>Madison</u>								
10D04M	Red Bluff	4800	40	4.7	1/30	1.5	2.7	-
<u>Gallatin</u>								
11D02M	College Site	4856	54	14.5	1/31	6.8	12.5	9.0
11E06M	Twenty-One Mile	7150	48	8.8	1/28	3.8	-	-
<u>Missouri Main Stem</u>								
10C01M	Kings Hill	7420	48	11.8	1/31	7.7	-	-
12C08M	Temple Pass	6350	48	5.9	1/30	3.9	-	-
<u>Yellowstone</u>								
10D11M	Battle Ridge	6020	48	15.4	1/31	9.3	13.8	-
10D07M	Northeast Entrance	7350	48	9.4	1/31	7.9	7.2	-
10C04M	Shields River	5850	48	17.8	1/31	8.9	10.0	-

SNOW SURVEY DATA

AS OF FEBRUARY 1, 1964

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

COLUMBIA RIVER BASIN

KOOTENAI RIVER

BC 10	Fernie	3500	1/31	34	4.5	2.2	7.3
BC 12A	Field	4200	1/31	20	4.1	3.8	4.5
BC 43	Gray Creek	5100	1/29	47	11.6	10.6	12.5*
BC 33	Kicking Horse	5400	1/31	40	9.7	10.3	10.9*
BC 20B	Kimberley	3800				-	6.2*
BC 32	Marble Canyon	5000	1/31	33	8.8	8.0	11.1*
BC 10B	Morrissey Ridge	6100				15.8	-
BC 10A	New Fernie	4100	1/31	47	5.4	6.3	11.1*
BC 8A	Sinclair Pass	4500	1/31	20	3.8	3.3	4.7*
BC 20A	Sullivan Mine	5100	1/31	36	8.2	8.8	9.6*

FLATHEAD RIVER

13A02	Desert Mountain	5600	1/31	39	10.8	6.7	10.8*
14A03	Hell Roaring Divide	5770	1/28	68	20.2	-	-
13B13	Holbrook	4530	1/29	33	6.2	4.7	7.5*
13A05	Marias Pass	5250	1/28	44	10.2	7.3	13.0
13B02	Spotted Bear Mt.	7000	1/29	37	7.4	6.4	11.0*
13B11	Twin Creeks	3580	1/29	36	8.6	3.8	8.8*

CLARK FORK RIVER

13B10	Coyote Hill	4200	1/31	31	6.7	5.0	8.0*
13C04	Intergaard	6450	1/31	23	4.9	5.6	4.9*
15B02	Lookout	5250	1/30	97	26.7	14.5	25.8*
13C21	Lubrecht Forest No. 3	5450	1/26	38	8.6	3.8	3.9*
13C22	Lubrecht Forest No. 4	4650	1/26	21	4.0	2.6	2.1*
13C08	Lubrecht Forest No. 6	4040	1/26	25	4.3	3.4	2.6*
13C05	Southern Cross	6500	1/31	18	4.1	5.0	3.8*
13C18	Spring Gulch	6000	2/1	38	9.0	8.4	-
13C07	Storm Lake	7780	1/28	34	7.0	10.6	8.8*
13C06	Stuart Mill	6500	1/31	22	4.8	5.1	4.3*
13C01	Stuart Mountain	7400	2/1	74	22.1	17.6	22.2*
14B01	TV Mountain	6800	1/26	47	10.6	11.0	11.2*

BITTERROOT RIVER

13D02	Gibbons Pass	7100	1/29	67	16.8	10.8	16.4*
13D16	Moose Creek	6200	1/28	59	14.0	5.7	12.2*

SNOW SURVEY DATA

AS OF FEBRUARY 1, 1964

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	AVERAGE

MISSOURI RIVER BASIN

BEAVERHEAD RIVER

12E03	Camp Creek	6800	1/28	25	5.0	2.9	7.0
11E12	Kilgore	6200	1/28	28	6.0	3.1	7.2

JEFFERSON RIVER

12C06	Picnic Grounds	6500	1/31	15	3.0	3.5	3.7*
12D01	Pipestone Pass	7200	1/27	15	3.2	5.4	3.2*

MADISON RIVER

11E09	Big Springs	6500	1/28	49	11.4	6.2	14.5
11E05	Hebgen Dam	6550	1/30	34	7.2	5.3	8.6
11E10	Island Park	6315	1/28	42	8.7	4.9	11.3
10E02	Norris Basin	7500	1/30	36	8.5	7.3	7.1*
11E08	Valley View	6500	1/28	45	11.5	7.6	10.9*
11E07	West Yellowstone	6700	1/30	32	6.8	3.8	8.8

GALLATIN RIVER

10D14	Arch Falls	7350	2/1	28	6.4	-	-
10D04	Devil's Slide	8100	2/1	48	11.9	14.6	11.9*
10D03	Hood Meadow	6600	1/31	21	4.6	8.7	5.1*
10D01	New World	6700	1/30	29	6.2	8.4	6.3*
11E06	Twenty-One Mile	7150	1/29	48	11.0	6.4	13.0

MISSOURI RIVER (Main Stem)

12C05	Chessman Reservoir	6200	No measurement		3.8	3.4
12C02	Tenmile Lower	6250	2/4	22	5.4	5.1
13C03	Tenmile Middle	6800	2/4	31	7.8	7.1
12C04	Tenmile Upper	8000	2/4	38	10.4	9.4

UPPER YELLOWSTONE RIVER

10E03	Canyon	7750	1/30	42	10.0	7.2	10.4*
10E06	East Entrance	7000	1/31	31	6.8	6.7	8.1*
9D05	Grizzly Peak	8400	1/30	19	4.1	10.3	-
10E04	Lake Camp No. 2	7850	1/30	30	4.4	3.0	7.4*
9E01	Lodgepole	8200	1/30	32	6.7	6.6	8.3*
10E01	Lupine Creek	7300	1/31	28	6.0	5.4	7.1*
10D07	Northeast Entrance	7400	1/31	24	5.4	6.0	6.0*
10E05	Sylvan Pass	7100	1/31	38	8.8	5.6	10.2*
10E07	Thumb Divide	7900	1/29	49	11.8	8.6	15.9*

RESERVOIR STORAGE DATA

AS OF JANUARY 31, 1964

(1000 Acre Feet)

BASIN	RESERVOIR	USEABLE CAPACITY	USEABLE STORAGE		
			THIS YEAR	LAST YEAR	AVERAGE

COLUMBIA RIVER BASIN

Flathead	Hungry Horse	3,428.0	2,450.0	2,775.0	2,620.0**
	Flathead Lake	1,791.0	1,591.0	1,399.0	991.7
	Camas 1/	45.2	17.9	26.7	23.6
	Mission Valley 2/	100.3	18.9	27.3	31.6
Clark Fork	Georgetown Lake	31.0	28.9	26.2	24.0
	Noxon	334.6	-	311.1	-
Bitterroot	Como	34.9	5.3	17.1	10.4
	Painted Rocks	31.7	22.8	-	10.1**

MISSOURI RIVER BASIN

Beaverhead	Lima	84.0	-	24.5	32.8
Ruby	Ruby	38.8	-	18.5	25.8**
Madison	Hebgen Lake	384.8	211.3	233.6	223.3
	Ennis Lake	41.0	39.2	39.1	35.7
Gallatin	Middle Creek	8.0	2.9	4.3	3.4**
Missouri	Canyon Ferry	2,043.0	1,732.0	1,951.0	1,612.0**
	Hauser & Helena	61.9	48.9	48.4	49.3
	Lake Helena	10.4	6.0	5.9	7.1**
	Holter Lake	81.9	56.9	34.0	62.1
	Smith River	10.7	7.4	7.2	5.2**
	Ackley Lake	5.8	-	3.8	3.9
	Durand	7.0	3.9	5.4	4.6
	Martinsdale	23.1	8.2	8.6	9.5
	Deadman's Basin	72.2	48.2	47.4	48.6**
	Fort Peck	19,410.0	11,720.0	9,878.0	11,030.0
Sun-Teton	Gibson	105.0	16.4	37.3	59.9
	Willow Creek	32.3	21.0	25.5	18.7
	Pishkun	32.0	17.5	18.4	19.3
Marias	Lower Two Medicine	16.6	-	-	0
	Four Horns	19.2	-	-	8.4
	Swift	30.0	10.3	10.1	20.9
	Lake Francis	112.0	33.2	65.0	88.4
Milk	Tiber	1,313.0	642.3	628.1	629.5**
	Fresno	127.2	39.8	33.1	64.0
	Nelson	66.8	33.2	45.9	35.6
Yellowstone	Lake Sherburne	66.1	16.0	-	18.7
	Mystic Lake	20.8	11.2	11.1	11.3
	Tongue River	68.0	40.7	30.9	7.4
	Cooney	27.5	-	14.9	9.1

1/ Sum of four small reservoirs on west side of Flathead Lake.

2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.

**Agencies Cooperating in Collecting Data Contained
in this Bulletin**

U. S. Forest Service
Region 1, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Bureau of Sports Fisheries
and Wildlife
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State University
School of Forestry
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch, Dept.
of Lands and Forests
Victoria, British Columbia

Department of Northern Affairs
and National Resources
Calgary, Alberta

State Engineer
Montana and Wyoming

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FEDERAL - STATE - PRIVATE
COOPERATIVE SNOW SURVEYS

Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*